ELECTROPHYSIOLOGY DATA ANALYSIS SYSTEM

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Analysis of electrophysiology data is usually a tedious, rote task, involving hundreds of measurements made by hand. Real-time, on-line computer analysis of electrophysiology data is difficult to implement due to frequent technical difficulties in properly identifying electrograms. Systems which digitize and store entire electrophysiology studies and then use on-screen manipulation of cursors to make measurements require large amounts of mass-storage and expensive hardware. This program is a simpler and more modest approach to computer-assisted data analysis. The program uses a standard personal computer and an inexpensive digitizing tablet. Data intervals are entered using a stylus or mouse-like cursor and are stored in tabular form in memory. Soft keys on the digitizing tablet are used to enter special symbols, such as non-capture or block, to skip or delete data intervals, or to enter comments. Full-screen editing of entered data can be performed using the digitizing tablet or the keyboard. Predefined or customized data entry templates can be used. There is automatic rounding of repeated measurements and calculation of derived data such as the QTc or corrected sinus node recovery times. The program can generate customized graphs of data (such as AV nodal conduction curves) and calculate refractory periods. Data storage is compact: A single 360 kilobyte floppy disk can hold archived data from over 30 electrophysiology studies.

In summary, this program is both a teaching tool and a practical and inexpensive way to analyze electrophysiology data.

PACKAGE FOR EVALUATION OF LONG TERM ELECTROCARDIOGRAMS FOR EVALUATION OF EFFECTS OF ANTIARRHYTHMIC DRUGS.

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Only empirical approaches have been used to define individual antiarrhythmic and arrhythmogenic effects of antiarrhythmic drugs. A new method for assessment of these effects has been developed based upon comparisons of statistical distributions of ectopic beats recorded on long term electrocardiograms (ECG). The method has been implemented as a package of programs for IBM PC AT compatible computers. It comprises 5 steps: (A) a standard analysis system is used to obtain a precise timing of each ectopic beat and arrhythmia episode; (B) random sampling of the record generates a population of independent observations of the arrhythmia; (C) the independent samples are used to construct empirical distribution curves; (D) the Smirnov test is employed to compare the empirical distribution curves. In order to obtain a true independent observations in the step (B), the random sampling can consider only a small portion of the complete record which may not be representative. Therefore, (E) the steps B - D are repeated many times (the number of repetitions is a parameter of the method) and the individual results of Smirnov tests are subsequently evaluated using the binomial test. The programs were written in *Turbo Pascal 5.0*, the source texts occupy more than 2500 lines. The statistical routines represent less than 20%, the other parts provide the sampling and complex data handling. The input to the package consists of the digitised Holter tapes, the output is generated in the form of tables which can be produced on several levels of detail and which summarise the statistical findings. The package has been tested in a pilot study involving 7 patients who suffered from a variety of ventricular arrhythmia. In each of these patients, one base-line Holter recording and one recording on each of three different drugs were made. The results showed that (a) the distributions of ectopic beats is highly individual making the methods based merely on their counting inappropriate, (b) treatment with an antiarrhythmic preparation may cause a significant change in the character of arrhythmia which cannot be classified as antiarrhythmic or arrhythmogenic, (c) the definition of arrhythmogenesis can be addressed in a precise mathematical way.